Committee on Resources

Subcommittee on Energy & Mineral Resources

Statement

Unforeseen Consequences of A New Governmental Royalty

By Douglas B. Silver
President
Balfour Holdings, Inc.
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Summary and Conclusions

The imposition of new mineral royalties has several unanticipated consequences. These issues need to be addressed prior to the government reaching a decision on the appropriate level and type of royalty it intends to impose.

The metals markets are international and prices are set by its global participants. A cost shift locally has an impact on global competitiveness. If the United States government wants its mining industry to remain competitive, it should design its domestic royalty objectives with a keen sensitivity to the international perspective.

Consequence One: The highly competitive nature of each metal's industry creates a cost structure in which the majority of mines produce metal within a narrow cost range. Substantial new royalties could render the U.S. mining industry uncompetitive or uneconomic within an international context because current operations fall within this range and additional costs could move it to the upper end of the range. To date, most U.S. operators have managed to keep their costs competitive despite other costs which uniquely influence U.S. mining operations, including but not limited to extensive regulations leading to longer lead times and costly and commonplace litigation by special interest groups.

Consequence Two: The added costs associated with a new royalty will reduce the amounts of metal which can ultimately be mined, thereby reducing the nation's metal reserves and shortening mine lives. The government should examine the trade offs between the lost revenues and jobs resulting from a shortened mine life and the revenues gained from the imposition of new taxes. It should also understand the adverse social and economic impacts caused to those rural regions dependent on mining.

Consequence Three: A fixed-term royalty uniformly applied to all types of metal deposits and processing methods will not have equal impacts on their economics. Capital-intensive pyrometallurgical processing, such as roasting and smelting, are expensive and normally involve third-party providers. Smelting and transportation costs leave less profits available to the mine's owner. Hydrometallurgical processing, such as heap leach or SX\EW, have lower processing costs, all of which are borne by the owner. In order to insure that certain types of operations are not disproportionally impacted by new royalties, the government should strive to impose Net Profit Interest-type royalty provisions which acknowledge the different cost structures related to variable deposit-types, mining and processing methods.

The government should be careful not to impose royalties which create trade-offs in cash flow rather than add value to the Treasury.

Consequence One: Impacts on narrow industry cost structure

Costs curves are excellent tools for illustrating the cost structure of a metal industry. In its simplest terms, the curve sorts the annual production from the lowest to highest cost. A graph is then constructed in which the vertical axis plots the cost of production and the horizontal axis displays cumulative production amounts on a percentage of total basis. As each mine on the curve produces different amounts of metal, the curve is actually a series of steps. The widest steps represent the largest producers and the shorter steps are the smaller operations.

Figure 1 presents a 1998 cost curve for the U.S. gold industry. The curve accounts for 85% of the reported production. It shows that 50% of the gold is produced at a cash operating cost of US$203 per ounce (Point A') and a total cost of $272 per ounce (Point A").

The shape of this curve is very important to understand. At the lower end (Point B), a few unique mines have exceptionally low costs of production. These mines form the beginning of the curve. The majority of mines have very similar cost structures which causes the curve to flatten out. The highest cost mines (Point C) form the upturn portion near the 100% cumulative production percentage. These mines are always in jeopardy of being closed due to unfavorable economics.

Two curves are normally presented. The Cash Operating Cost curve presents the cost of expensed production, including direct mining, processing, smelting, transportation, labor and supplies. The Total Production Cost includes the Cash Cost items, plus royalties, environmental reclamation costs, and depreciation. Appendix I contains the Gold Institute's Standards for Reporting Production Costs. These standards are currently being adopted by the international gold mining industry.

According to Gold Fields Mineral Services, the 1998 weighted Cash and Total Costs of U.S. production is $185 and $257 per ounce, respectively, as compared to world Cash and Total Costs of US$206 and $261 per ounce, respectively. (The difference between Gold Fields' and Balfour's numbers reflect the differences between using weighted mean and median averages, respectively.)

From a competitive viewpoint, those companies which produce gold in the lower 25% of the cost curve (less than $210 per ounce on a total cost basis) have the competitive advantage while those in the upper 25% (greater than $300 per ounce) are at risk of closure. Through the use of emerging technologies and best business practices, companies continually strive to lower their production costs.

Because of the narrow cost range (i.e. the curve is "flat"), an increase in costs can rapidly "slide" a company from being in the lower 25% to the upper 25%. Once moved, the mine's profitability declines and its future becomes precarious.

New government royalties would shift our mines toward the upper end of the world cost curves. This, in turn, would place our mines at a competitive disadvantage. Based on prior submissions to the Committee, our company estimates that an 8% gross royalty would add $28 to $31 per ounce to the cost of production.

Consequence Two: Effect of cutoff changes on resource size

Another consequence of increased royalties is its double jeopardy effect on mines. Aside from reducing the mine's profitability, an increased royalty will also reduce the nation's amount of metal reserves.

When mineral deposits are modeled during their feasibility stage, a value is determined below which a ton of rock becomes waste and above which it qualifies as "Ore" and is extracted for metal recovery. The crossover value, or "cutoff grade" is dictated by the production costs.

Mineral deposits contain heterogeneous distributions of metals. This stands to reason because high-grade veins or pods are often surrounded by lower-grade ores. Therefore, when cutoff grades, i.e. costs, increase, lower grade ores revert to waste. If the mine has large quantities of low-grade ores, then the increased cutoff grade will convert a disproportional amount of the deposit and reclassify it as waste. This relationship is most applicable to large, open-pit mines.

Changes in cutoff grades can shorten mine life and the sequence in which the ore deposit is mined. Under certain scenarios, the lower grade material will permanently become uneconomic.

Three examples are presented in this paper. The first case involves the Golden Zone gold deposit in Alaska. As shown graphically in Figure 2, for every $1.00 per ton increase in cutoff grade, 5,000 gold ounces become uneconomic.

The Mineral Ridge mine in Nevada loses 2,750 ounces for each $1.00 per ton change in cutoff grade while the Johnson Gulch project in South Dakota loses 6,300 ounces. When multiplied by a $300 per ounce gold price, the gross value of sterilized metal amounts to more than $4 million dollars simply from a small change in cutoff grades.

All three of these examples involved relatively small deposits. As the larger mines are more dependent on lower-grade ores, the effect of these cutoff changes become magnified.

Given that most mines are located in remote regions, shortening the mine's life will also have economic ramifications to the local and state economies.

Consequence Three: Profitability on different metals

Different metals employ different types of processing technology. In general terms, these can be divided into two types based on their processing methods. Pyrometallurgical processes use thermal methods and hydrometallurgical processes use chemical methods.

Gold and SX\EW copper mines employ hydrometallurgical processes. Chemicals are applied to an ore pile to liberate the metals. Recovery of the metals from the "pregnant solutions" produces a product which only requires refining before it can be sold to the market. The associated capital costs to build these mines are typically measured in tens of millions of dollars.

By contrast, sulfide ores require extensive concentration by milling and flotation, followed by energy-intensive roasting or smelting. Mines requiring smelting also tend to incur substantial transportation charges and enormous capital costs (measured in hundreds of millions to billions of dollars). The operating costs for milling, transportation and smelting can account for 70% to 80% of the ore's gross or *insitu* value of the rock, whereas leaching would constitute 30% to 50% of the value. When the large differences in capital expenditures are factored in, the profit margins can become very small for smelting\ roasting operations. These large operations also require large staffs to operate these complex facilities.

A uniform royalty would unfairly penalize companies with high capital costs and low- profit margins. A Net Profits Interest-type royalty would provide the government with revenues commensurate with the scale of production and profitability. Therefore, highly profitable mines would pay larger royalties.

Appendix I

Gold Institute's

Standards of Reporting Production Costs

(Testimony Attachment)

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